Measurement and Analysis of Alfvén Wave Patterns Imprinted Upon Atmospheric Haze via Precision Timing Mechanisms May Enable Inferences as to Characteristics of Near-Parallel Light

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Introduction

While Alfvén Waves are usually discussed in the context of the effects of powerful magnetic fields acting upon electromagnetism emanating from high-temperature solar plasmas, sc. EUV light passing through solar spikes, the fact that magnetic fields have an effect upon electromagnetism suggests that there may be a novel method not previously considered for taking advantage of photon-photon interactions for the application of photographic reconnaissance.

Abstract

Not unlike the concept of spectral lines, which are a set of specific frequencies of light absorbed by specific materials, Alfvén Waves can be used to provide clues as to the intensity and duration of exposure of electromagnetism to a magnetic field. Although the Earth's magnetic field is far weaker than that surrounding the Sun, Alfvén Waves may be predicted to be imprinted upon electromagnetism (sc. light) approaching, reflecting from and moving away from the surface of the Earth.

Natural light is scattered easily by atmosphere and creating progressively larger lenses and mirrors for space telescopes is not a practical solution to the challenge posed by this scattering. In addition to other innovations, many of them, incidentally, coming from this very author, we may find it useful to take advantage of the Alfvén Effect, which causes waves of photons to cluster together and for there to be temporal gaps, as opposed to spectral gaps, in photons detected. These gaps could be predicted to be on the order of picoseconds and would vary in their length according to the intensity and duration of exposure to the field.

The advent of miniaturized precision timing mechanisms opens up the possibility of performing a real-time analysis of light interpreted by a sensor with precision timing being used to measure these picosecond-scale silences caused by the Alfvén Effect.

Although photon-photon interactions, even over these distances, are too weak to be of use, *the interaction between clusters of waves and the Alfvén Gaps of near-parallel light may be usefully exploited*. I will now endeavor to explain how this may be possible.

Nitrogen-associated light-reflections, the very reflections which cause nitrogen-based atmosphere to take on a blueish color, create a skew in the apparent color of images captured from space. You can personally observe this effect by looking at trees several miles away and observing that they appear to be blue-green rather than green. Historically, this coloration of images has been considered to be a nuisance and algorithms have been used to correct for color balance.

Rather than discounting this blue-tinted atmospheric reflection, I propose that this light actually carries useful information concerning light which might otherwise be received by a telescope with a larger mirror. As it is generally agreed that it would be impractical to make telescopes of progressively larger size, we must find a different way to overcome the diffraction limit.

If we were to identify and logically segregate the light associated with atmospheric haze by looking for Alfvén Waves consistent with a lesser degree of interaction with Earth's magnetic field (shorter temporal gaps,) *that light could then be further analyzed for evidence of not photon-photon interaction, but rather, the diffusion of light associated with nitrogen reflection into the Alfvén Gaps associated with near-parallel light reflected from ground level.*

Assessing Near-Parallel Light Frequency and Intensity Characteristics Inferentially

The magnetic field strength of the Earth being a known quantity, we can readily make inferences as to from which altitude light reflected from atmosphere before striking the ground made its reflection. The higher the altitude, the shorter the Alfvén Gaps. The Alfvén Gaps of this light could be predicted to be far shorter in temporal terms than that of light traveling all the way to the ground and all the way back to a sensor platform in orbit, however, even more subtle differences in the lengths of these gaps can inform us as to the precise altitude of the source.

Light on near-parallel paths relative to the light one wishes to measure would have the greatest opportunity to interact with the atmosphere-associated haze. Although light from all sides of measured atmospheric corridors would have some influence upon the properties of nitrogen-associated reflected light and would contribute a type of noise, light from the area which one wishes to observe will always have a maximal relative effect. This would imply that as influences upon nitrogen-associated light could be expected to emanate from all portions of the edges of that corridor, this absence of directional specificity could be overcome through real-time knowledge of the color characteristics (through more conventional means) of the objects nearby to the object to be imaged as this knowledge can be used to discern which alterations to the Alfvén Pattern of light reflected from atmosphere are associated with the object to be photographed and which are associated with nearby objects.

When light with Alfvén Gaps of, for example, 1ps travel in near-parallel with light with larger gaps, the Alfvén Effect begins to run in reverse and, over a distance, the gap could be predicted to close with the aid of the diffusive tendency of the

nitrogen-associated light toward the comparatively high-magnitude gaps in the ground-object-associated light. To understand this reversal effect, think of the way that cars travel in clusters as a result of the timing of traffic signals and why it is that there are, in fact, fewer breaks in the traffic resulting from these patterns on days when cars travel more slowly (such as in the rain) making it more difficult to pull into traffic from a side street under this condition. Some of the cars want to move more quickly, but their maximum speed is set by the slowest vehicle and thus, provided a sufficient distance between signals, there may be few or no breaks in traffic as a result of the inability of the cars to exceed one another. Photons certainly may exceed one another on the quantum level, but electroweak forces result in an overall tendency against this which ultimately results in the closure of any gaps and the most diffuse possible configuration of waves. If we think of these gaps as a sort of void to be filled in which the tendency of energy to move toward the void is proportional to its magnitude, the magnitude of that void could be expected to vary depending upon the frequency of the near-parallel light in the surrounding area. If the magnitude of the void is greater on one fringe of the corridor than another, this could be predicted to manifest itself in the form of an extremely subtle skew in the chief polarity of the atmosphere-associated reflected natural light.

Advanced optics technologies such as this author's own Divergent Moment Photonic Sensor system; which relies upon photon-photon interaction using photons with modified magnetic properties in order to perform image capture; would work hand-in-glove with this exploitation of the Alfvén Effect in order to reclaim information lost to light scattering. Such advanced methods may be necessary in order to exploit the effect as what one would need to measure is Alfvén Gap closure resulting from the interaction between nitrogen-associated light and the Alfvén Gaps associated with light reflected from objects on the ground. As this would manifest itself in shifts between the chief polarity of nitrogen-associated light as it travels over time and distance, an imaging system would be required which is capable of not only capturing images of extremely high resolution in its own right, but one which is capable of measuring the polarity characteristics of light along with color and brightness properties with a granularity of a single pixel.

As the Alfvén characteristics of that nitrogen-associated light could be used to inform us of precisely at which altitude light reflected from the atmosphere, a cross-comparison of the chief polarity of the nitrogen-associated light at various points along its journey may be used to infer the frequency of the light traveling in near-parallel to it. As natural light should have an even distribution of polarity, any statistical skew in the polarity of the nitrogen-associated light could be reasonably expected to be the result of the Alfvén Gap Closure Effect. This forms the basis of a radical new approach to inferential imaging.

Conclusion

Although highly ambitious and demanding both of precision timing and computing power, such an approach now falls within the realm of possibility.

Although many other promising approaches to enhanced optics have already been promulgated by this author, this additional approach provides yet another option for further advancing the state of the art.

Once DMPS is fully developed, however revolutionary, if one wished to take orbital reconnaissance a step beyond even that advanced capability, it will be necessary to begin to consider extracting information from nitrogen-associated reflected light in the aforementioned manner in order to overcome the atmospheric scattering of natural light.